AMENDMENTS TO THE CLAIMS:

Please replace the claims with the claims provided in the listing below wherein status, amendments, additions and cancellations are indicated.

1. (Canceled)

2. (Canceled)

3. (Currently Amended) A rolling bearing apparatus, comprising:

a rolling element formed as an inner ring of a bearing;

a non-rolling element disposed concentrically with said rolling element;

a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of said rolling element and said non-rolling element;

said rotation detector comprising:

a rotor provided as part of said inner ring;

a stator provided on said non-rolling element; and

an exciting winding and output windings wound to said stator, wherein

said output windings ~~induce a~~ output the induced voltage induced according to a gap permeance between said

rotor and said stator in response to said exciting voltage inputted to said exciting winding;

said stator including a plurality of polar teeth opposing said rolling element, and said exciting winding and output windings being wound to each of said polar teeth of said stator, and

said rotor comprising a flat portion on a portion of a circumferential surface of said inner ring which opposes said plurality of polar teeth and is an outer peripheral shoulder of said inner ring.

4. (Canceled)

5. (Currently Amended) A rolling bearing apparatus, comprising:

a rolling element;

a non-rolling element disposed concentrically with said rolling element;

a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of said rolling element and said non-rolling element;

said rotation detector comprising:

a rotor provided on said rolling element;

a stator provided on said non-rolling element; and

an exciting winding and output windings wound to said stator, wherein

said output windings ~~induce a~~ output the induced voltage induced according to a gap permeance between said rotor and said stator in response to said exciting voltage inputted to said exciting winding;

said rolling element being made up of two inner rings disposed adjacent to each other in an axial direction and each having an inner ring raceway groove;

said rotor being provided at an area whereat outer peripheral annular surface areas of said two inner rings oppose each other in the axial direction;

said non-rolling element being an outer ring disposed concentrically with said two inner rings in an outward-radial direction;

said outer ring having two outer ring raceway grooves in an inner peripheral surface thereof, said two outer ring raceway grooves being separated away from each other in an axial direction and opposing respective ones of said inner ring raceway grooves of said two inner rings;

said stator being provided in a region between said outer ring raceway grooves of said outer ring;

said rotor having first and second inner circumferential surfaces disposed adjacent each other in the axial direction;

said inner rings respectively having inner ring outer circumferential surface end portions adjacent one another in the axial direction;

said rotor being fixed by fixedly fitting said first inner circumferential surface onto the inner ring outer circumferential surface end portion of one of said inner rings; and

said second inner circumferential surface having a greater diameter than said inner ring outer circumferential surface end portion of another one of said inner rings and being disposed opposing said inner ring outer circumferential surface end portion of said another one of said inner rings and out of contact with said inner ring outer circumferential surface end portion of said another one of said inner rings such that said rotor does not contact said another one of said inner rings.

6. (Canceled)

7. (Original) The rolling bearing apparatus according to claim 5, wherein said exciting winding and said output windings are lead out from a through-hole provided in an area on a center of a circumference of said outer ring in an axial

direction.

8. (Currently Amended) The rolling bearing apparatus, comprising:

a rolling element;

a non-rolling element disposed concentrically with said rolling element;

a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of said rolling element and said non-rolling element;

said rotation detector comprising:

a rotor provided on said rolling element;

a stator provided on said non-rolling element; and

an exciting winding and output windings wound to said stator, wherein

said output windings ~~induce a~~ output the induced voltage induced according to a gap permeance between said rotor and said stator in response to said exciting voltage inputted to said exciting winding; and

said stator including a plurality of polar teeth opposing said rolling element, and said exciting winding and output windings being wound to each of said polar

teeth of said stator;

wherein said rolling element comprises:

a hub wheel; and

an inner ring fitted on an outer periphery of said hub wheel;

and

said rotor being a nut mounted on said hub wheel so as to secure said inner ring to said hub wheel, wherein said nut is hexagonal thus including ~~includes a~~ flat ~~portion~~ portions which ~~opposes~~ oppose said plurality of polar teeth and vary said gap permeance with rotation of the nut.

9. (Previously Presented) The rolling bearing apparatus according to claim 8, wherein:

said hub wheel has first and second axial ends, said hub wheel has, in sequential order from said first axial end, a flange provided proximate said first axial end, a ring seat surface having a ring seat diameter, and a threaded portion having an outer thread diameter less than said ring seat diameter;

said inner ring is mounted on said ring seat surface;

said threaded portion is at said second axial end of said hub wheel; and

said nut is mounted to said hub wheel by being threaded on said threaded portion, said rotor being formed of said nut;

said non-rolling element is an outer ring disposed concentrically about said hub wheel;

a cap is mounted in an opening of said outer ring; and

said stator is fixed to an inner periphery of said cap and said stator opposes said nut in a radial direction.

10. (Currently Amended) A rolling bearing apparatus, comprising:

a rolling element;

a non-rolling element disposed concentrically with said rolling element;

a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of said rolling element and said non-rolling element;

said rotation detector comprising:

a rotor provided on said rolling element;

a stator provided on said non-rolling element; and

an exciting winding and output windings wound to said stator, wherein

said output windings ~~induce a~~ output the induced voltage induced according to a gap permeance between said rotor and said stator in

response to said exciting voltage inputted to said exciting winding;

said rolling element comprising:

a hub wheel having first and second axial ends, said hub wheel having in sequential order from said first axial end a flange provided proximate said first end, an intermediate circumferential surface having a first diameter, a ring seat surface having a ring seat diameter less than said first diameter, and a threaded portion having an outer thread diameter less than said ring seat diameter; and

an inner ring mounted on said ring seat surface;

said non-rolling element being an outer ring disposed on an outer periphery of said hub wheel;

said stator being mounted in an axially center region of an inner circumferential surface of said outer ring; and

said rotor being formed by at least one notch provided at an area on said intermediate circumferential surface of said hub wheel.

11. (Currently Amended) A rolling bearing apparatus, comprising:

a rolling element;

a non-rolling element disposed concentrically with said rolling element;

a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of said rolling element and said non-rolling element;

said rotation detector comprising:

a rotor provided on said rolling element;

a stator provided on said non-rolling element; and

an exciting winding and output windings wound to said stator, wherein

said output windings ~~induce a~~ output the induced voltage induced according to a gap permeance between said rotor and said stator in response to said exciting voltage inputted to said exciting winding;

said rolling element comprising:

a hub wheel having first and second axial ends, said hub wheel having in sequential order from said first axial

end a flange provided proximate said first end, an outer raceway portion with first outer raceway groove having first outer raceway groove diameter, an intermediate circumferential surface having a first diameter, a ring seat surface having a ring seat diameter less than said first diameter, and a threaded portion having an outer thread diameter less than said ring seat diameter; and

an inner ring mounted on said ring seat surface and having a second inner raceway groove having a second inner raceway groove diameter less than said first inner raceway groove diameter;

said non-rolling element being an outer ring disposed concentrically with said hub wheel and having first and second inner raceway grooves in an inner circumferential surface respectively opposing said first and second inner raceway grooves;

a first set of balls disposed in said first inner and outer raceway grooves and having a first pitch circle diameter, a second set of balls disposed in said second inner and outer raceway grooves and having a second pitch circle diameter less than said first pitch circle diameter;

said stator being mounted in an axially center region of an inner circumferential surface of said outer ring; and

said rotor being formed by notches provided at a plurality of areas on said intermediate circumferential surface.

12. (Currently Amended) A rolling bearing apparatus, comprising

a rolling element in the form of an inner bearing ring;

a non-rolling element disposed concentrically with said rolling element, said non-rolling element being in the form of an outer bearing ring;

a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of said rolling element and said non-rolling element; [[and]]

a generator for generating a voltage using energy provided by relative rotation of said rolling element relative to said non-rolling element and inputting the voltage as an input exciting voltage to said rotation detector, said generator having a first portion mounted to said inner bearing ring and a second portion mounted to said outer bearing ring, said generator comprising:

a generating rotor provided as said first portion in said rolling element by disposing magnetic poles with different polarities alternately in a circumferential direction; and

a generating stator provided as said second portion in said non-rolling element and having an electric coil opposing the magnetic poles of said generating rotor in an radial direction, the electric coil producing the voltage input as said exciting voltage; and

said rotation detector comprising:

a rotor provided on said rolling element;

a stator provided on said non-rolling element; and

an exciting winding and output windings wound to said stator, wherein

said output windings output the induced voltage induced according to a gap permeance between said rotor and said stator in response to said exciting voltage inputted to said exciting winding.

13. (Cancelled)

14. (Previously Presented) The rolling bearing apparatus according to claim 3, further comprising a radio transmitter for radio-transmitting signals outputted

from said rotation detector to a signal processing unit provided outside.

15. (Currently Amended) The rolling bearing apparatus, comprising:

a rolling element;

a non-rolling element disposed concentrically with said rolling element;

a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of said rolling element and said non-rolling element;

said rotation detector comprising:

a rotor provided on said rolling element;

a stator provided on said non-rolling element; and

an exciting winding and output windings wound to said stator, wherein

said output windings ~~induce a~~ output the induced voltage induced according to a gap permeance between said rotor and said stator in response to said exciting voltage inputted to said exciting winding; and

said stator including a plurality of polar teeth opposing said rolling element, and said exciting winding and output windings being wound to each of said polar

teeth of said stator,

said rotor comprising a flat portion on a portion of a circumferential surface of said rolling element which opposes said plurality of polar teeth;

a radio transmitter for radio-transmitting signals outputted from said rotation detector to a signal processing unit provided outside; and

a generator for generating a voltage using energy provided by relative rotation of said rolling element and said non-rolling element, and inputting the voltage as an input exciting voltage to said rotation detector while supplying [[it]] the voltage as a driving voltage to said radio transmitter, said generator comprising:

a generating rotor provided to said rolling element by disposing magnetic poles with different polarities alternately in a circumferential direction; and

a generating stator provided to said non-rolling element and having an electric coil opposing the magnetic poles of said generating rotor in an radial direction, the electric coil producing the voltage input as said exciting voltage.

16. (Previously Presented) The rolling bearing apparatus according to claim 3, further comprising a signal processing unit for processing output signals from

said rotation detector.

17. (Original) The rolling bearing apparatus according to claim 12, further comprising a signal processing unit for processing output from said generator.

18. (Original) The rolling bearing apparatus according to claim 14, further comprising a signal processing unit for processing output signals from said radio transmitter.

19. (Previously Presented) The rolling bearing apparatus according to claim 3, wherein said rotation detector comprises a resolver which induces the voltage according to a gap permeance between said rotor and said stator in response to an exciting voltage inputted to said exciting winding from said output windings.

20. (Previously Presented) The rolling bearing apparatus according to claim 3, wherein said non-rolling element opposes said rolling element at least in part in a radial direction of the rolling bearing apparatus.

21. (Previously Presented) A rolling bearing apparatus, comprising:

a rolling element including a first raceway wheel;

a non-rolling element disposed concentrically with said rolling element and including a second raceway wheel, said rolling element rolling with respect to said non-rolling element;

a rotation detector providing an induced voltage output produced from an input exciting voltage and influenced according to a gap permeance related to a relative rolling state of said rolling element and said non-rolling element;

a rotor disposed in said rolling element;

a stator disposed in said non-rolling element;

an exciting winding and output windings disposed on said stator, said exciting winding being excited by said exciting voltage and said output winding providing said induced voltage output;

said rotor and said stator being disposed opposing one another in an annular space between said rolling element and said non-rolling element; and

said output windings outputting said induced voltage output at a level determined by the gap permeance between said rotor and said stator and by said input exciting voltage,

wherein said rolling element is an inner ring of a bearing and said non-rolling element is an outer ring of the bearing, and said rotor is formed of the inner ring and includes a flat portion of an outer circumferential surface of the inner ring.